

SINDH MDCAT PAPER 2023 (CODE-A)

BIOLOGY

1. Which of the following best characterizes the viruses with un-enveloped plus-strand RNA? (1 point)

- Lacking envelope
- Having DNA
- Act indirectly
- Enveloped

2. Through which of the following does rabies spread? (1 point)

- Cat
- Fox
- Dog
- Pig

3. The hepatitis which pass from mother to her child during pregnancy is: (1 point)

- Hepatitis A
- Hepatitis B
- Hepatitis C
- Hepatitis D

4. A virus enters into the body of host & intends to produce DNA from RNA. (1 point)
Which enzyme is required for this process?

- Transcriptase
- Reverse transcriptase
- Oxido reductase
- Ligases

5. Which of the following is the end product of anaerobic respiration? (1 point)

- ☐ Methyl alcohol
- ☐ Acetaldehyde
- ☐ Formaldehyde
- ☒ Ethyl alcohol

6. What's the importance of Krebs's cycle? (1 point)

- ☐ Production of amino acids
- ☐ Production of vitamins
- ☒ Production of ATP molecules through oxidative phosphorylation
- ☐ Production of pyruvic acid

7. The acceptor of carbon dioxide in Krebs's cycle is: (1 point)

- ☒ RuBP
- ☐ RuMP
- ☐ PGA
- ☐ PGAL

8. Anaerobic respiration compared to aerobic respiration, it produces? (1 point)

- ☐ More ATPs
- ☒ Less ATPs
- ☐ Equal ATPs
- ☐ Does not produce ATPs

9. In carbohydrate hydrogen & oxygen are mostly in the same ratio i.e. 2:2 (1 point)
that's why they are called:

- ☐ Carbon monoxide
- ☐ Carbon dioxide
- ☒ Hydrated carbon
- ☐ Triose

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10. How much of temperature ($^{\circ}\text{C}$) rise will be observed, as per the definition (1 point) of specific capacity, if energy is used to raise the temperature of 1 gram of a substance?
- 1°C
 - 2°C
 - 3°C
 - 10°C
11. The chemical compound has the same percentage (%) in the bacterial as (1 point) well as the mammalian cell:
- Carbohydrate
 - Protein
 - Lipids
 - Water
12. Glyceraldehyde & dihydroxy acetone are examples of: (1 point)
- Triose
 - Tetrose
 - Pentose
 - Hexose
13. The one molecule of fatty acid forming ester bond with one molecule of (1 point) long chain alcohol is:
- Saturated acylglycerol
 - Unsaturated acylglycerol
 - Phospholipids
 - Waxes
14. Lysozyme represent this basic structural level of protein s: (1 point)
- Primary structure
 - Secondary structure
 - Tertiary structure

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- Quaternary structure

15. Which of the following compound is regarded as the precursor of many hormones like testosterone, progesterone and estrogens? (1 point)

- Wax
- Cholesterol
- Phospholipids
- Acylglycerol

16. Which one is the power house of cell? (1 point)

- Ribosome
- Golgi apparatus
- Mitochondria
- Lipid chloroplasts

17. A phospholipid molecule has a head and two tails. Where are the tails found? (1 point)

- At the surface of membrane
- In the interior of membrane
- In the exterior of membrane
- Spanning of the membrane

18. Which of the following may lead to the death by the age of three years ? (1 point)

- Baucher disease
- Gaucher's disease
- Tay-Sachs disease
- Krabbe's disease

19. Which of the following best describes the plasma membrane? (1 point)

- Adhesible
- Permeable

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- ☐ Impermeable
- ☒ Semipermeable

20. What is the cementing layer between two daughter cells called? (1 point)

- ☐ Primary wall
- ☐ Secondary wall
- ☒ Middle lamella
- ☐ Cell membrane

21. Protein layers is embedded in lipid bilayers, this was explained by: (1 point)

- ☐ Lock & Key Model
- ☐ Induce Fit Model
- ☒ Fluid Mosaic Model
- ☐ Sandwich Model

22. Just given function is associated with lysosome s: (1 point)

- ☐ Protein synthesis
- ☐ Processing & packaging
- ☒ Intracellular digestion
- ☐ Lipid synthesis

23. How long does it take in action potential to occur? (1 point)

- ☐ Few minutes
- ☒ Few milliseconds
- ☐ Few hours
- ☐ Few seconds

24. This part of brain involve in carrying long term memory: (1 point)

- ☒ Hippocampus
- ☐ Cerebellum

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- ☐ Cerebrum
- ☐ Pons

25. A reflex involve sensory and a motor neuron the way such transmission is (1 point) called:

- ☐ Synapse
- ☐ Mono synaptic
- ☒ Reflex arc
- ☐ Synaptic cleft

26. These are required for the impulse to transfer from presynaptic to post-synaptic neuron: (1 point)

- ☐ Sodium
- ☐ Potassium
- ☒ Calcium
- ☐ Proteins

27. Which of the following function dopamine serves? (1 point)

- ☐ Transmission blocker
- ☒ Neurotransmitter
- ☐ Anesthesia
- ☐ Sedative

28. Which part of the brain is responsible for higher cognitive functions such (1 point) as thinking reasoning and problem solving?

- ☐ Medulla oblongata
- ☐ Cerebellum
- ☒ Cerebrum
- ☐ Hypothalamus

29. What is formed, when the blastula folds inwards? (1 point)

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- ☐ Morula
- ☐ Blastocoel
- ☐ Blastopore
- ☒ Gastrula

30. Which phenomenon describes the production of asexual form by sexual form and vice versa? (1 point)

- ☐ Colony
- ☒ Alternation of generation
- ☐ Parasitism
- ☐ Polymorphism

31. Which of the following describes coral reefs used by Hakeem in preparing eastern medicines? (1 point)

- ☐ Diamond
- ☐ Emerald
- ☐ Ruby
- ☒ Marjan

32. Evolutionary progress towards formation of organ system in cnidarians includes development of enteron and: (1 point)

- ☒ Rudimentary network of nerves
- ☐ Symmetry
- ☐ Cnidocytes
- ☐ Cellular organization

33. What's the optimum pH of pepsin in stomach? (1 point)

- ☐ 3
- ☐ 2
- ☐ 2.5
- ☒ 1.4

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34. At equilibrium, a scientist added more substrate and observed an increase (1 point) in the rate of the reaction which soon declined. He added some more substrate but this time the rate of the reaction remain unaffected. What was the reason?
- ☐ Enzyme did not function
 - ☒ Feedback due to the accumulation of the end product
 - ☐ Enzyme was more than substrate's active sites
 - ☐ Substrate did not function
35. Penicillin blocks the active sites of an enzyme that many bacteria use in making cell wall. It is an example of: (1 point)
- ☒ Competitive inhibition
 - ☐ Incompetative inhibition
 - ☐ Feedback inhibition
 - ☐ Radiation effect
36. The structure of an enzyme is altered by (1 point)
- ☐ Irreversible inhibition
 - ☐ Reversible inhibition
 - ☐ Competitive inhibition
 - ☒ Non competitive inhibition
37. Chemical substance that can react with an enzyme faster than real substrate and without produce a product is: (1 point)
- ☐ Accelerator
 - ☒ Inhibitor
 - ☐ Coenzyme
 - ☐ Activator
38. Which of the following is a good evidence of an evolutionary pathway leading from reptiles to birds? (1 point)
- ☐ Mammals
 - ☐ Fishes

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- Archaeopteryx
- Arthropods

39. The evolution of birds has long been a difficult issue for biologists until the discovery of the Archaeopteryx fossil in 1861. This ancient bird exhibited teeth, a long tail containing 20 vertebrae and wings with movable finger and claws. In the light of mentioned facts who were the ancestors of the birds? (1 point)

- Insects
- Pisces
- Amphibians
- Reptiles

40. The artificial selection in breeding provides a strong evidence for evolution. What does this term means? (1 point)

- Vestigial organs
- Domestication
- Mutation
- Homology

41. Carolus Linnaeus was the believer of: (1 point)

- Catastrophism
- Inheritance of acquired characters
- Natural selection
- Special creation

42. What is the volume of blood pumped per minute by the left ventricle into the system circuit called? (1 point)

- Cardiac output
- Systole
- Atrial system
- Ventricular system

43. Which enzyme is secreted in an inactive state, to prevent it from digesting its own cells? (1 point)
- ☐ Lactase
 - ☐ Sucrase
 - ☐ Maltase
 - ☒ Pepsin
44. Carnivorous adaptation of plants, due to relatively low content of: (1 point)
- ☒ Nitrogen
 - ☐ Potassium
 - ☐ Sulphur
 - ☐ Calcium
45. In nutritional terms, what among the following is sundew you categorized? (1 point)
- ☐ Autotrophic
 - ☐ Heterotrophic
 - ☐ Holozoic
 - ☒ Partially autotrophic/partially heterotrophic
46. Which of the following statements is correct about semilunar valves? (1 point)
- ☒ Present in veins to prevent backward flow
 - ☐ Present in arteries to regulate jerks in pulsations
 - ☐ Present in capillaries to regulate flow of blood
 - ☐ Present in aorta to prevent backward flow
47. The total capacity of a human lung is 5 litres. What percentage of it is filled when one takes an extra deep breath? (1 point)
- ☐ 10%
 - ☐ 40%
 - ☐ 60%

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- 80%

48. Earthworm is an example of: (1 point)

- Detritivores
- Fluid feeder
- Macrophagous
- Microphagous

49. Photosynthesis bacteria utilise H₂S instead of water and liberate one of the following instead of oxygen: (1 point)

- Sulphur
- Phosphorus
- Calcium
- Magnesium

50. Which of the following are the genetically engineered bacteria that are used to make human growth hormone and insulin for diabetics? (1 point)

- Pneumococcus
- E. Coli
- Rhizobium
- Nost

51. Bacterial cell wall made-up of: (1 point)

- Cellulose & pectin
- Cellulose & cutin
- Hemicellulose & chitin
- Amino acid & sugar

52. It serves as vector in genetic engineering: (1 point)

- Plastids
- Plasmid

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- ☐ Nucleoid
- ☐ Pills

53. Membranous infoldings in bacteria that initiate DNA replication is: (1 point)

- ☒ Mesosomes
- ☐ Peroxisomes
- ☐ Glyoxysomes
- ☐ Nucleosomes

54. Testes developed inside the abdomen. In which of the following structure do they lie before birth? (1 point)

- ☐ Sac
- ☒ Scrotum
- ☐ Pouch
- ☐ Vesicle

55. In the process of ovulation, which of the following structures sucks the egg released from alternate ovary, every month (1 point)

- ☒ Oviducts
- ☐ Uterus
- ☐ Vagina
- ☐ Ureter

56. After ovulation Graafian follicle converts into: (1 point)

- ☐ Corpus callosum
- ☐ Corpus albicans
- ☒ Corpus luteum
- ☐ Corpus atresia

57. Fertilization of ovum takes place in rabbit, man and other placental mammals in: (1 point)

- ☐ Ovary
- ☐ Uterus
- ☐ Cervix
- ☒ Fallopian tube

58. Corpus luteum in mammals occur in: (1 point)

- ☐ Brain & connects the two cerebral hemispheres
- ☒ Ovaries & produces progesterone hormones
- ☐ Heart & initiate arterial connection
- ☐ Skin & acts as a pain receptor

59. How are the ribs attached to vertebrae? (1 point)

- ☐ Fixed joints
- ☐ Moveable joints
- ☐ Ball & socket joints
- ☒ Partially movable joints

60. Which cavities are present around the joints and contain a thin oily fluid (1 point) that reduces friction and keeps the joints moving freely?

- ☒ Synovial
- ☐ Ventricles
- ☐ Acetabulum
- ☐ Deltoid ridge

61. This muscle controls the diameter of your blood vessels: (1 point)

- ☒ Smooth muscles
- ☐ Striated muscles
- ☐ Cardiac muscles
- ☐ Skeletal muscles

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62. When Mendel crossed together two contrasting homozygous individuals, (1 point)
the phenotype of the hybrid in F1 cross appeared to be that of:

- ☐ Recessive parent
- ☒ Dominant parent
- ☐ Indifferent
- ☐ Half dominant & recessive

63. If a dihybrid cross is made between *Pisum sativum* plants producing (1 point)
Yellow/Round and Green/Wrinkled seeds. Results of F2 generation show:

Yellow/Round= 9/16

Yellow/Wrinkled= 3/16

Green/Round= 3/16

Green/Wrinkled= 1/16

Which ratios of these results confirm independent assortment had taken place?

- ☐ 9/16
- ☐ 3/16
- ☐ 1/16
- ☒ 3/16 & 3/16

64. An orthopedic specialist observed the X-ray of the joint of a patient and (1 point)
detected hardening of the cartilage due to excess calcium deposit.

Consequently, the joint was very stiff and crippled the patient. What was the patient suffering from?

- ☐ Disc slip
- ☐ Spondylosis
- ☒ Arthritis
- ☐ Sciatica

65. Which of the following is a disease in which the blood fails to clot? (1 point)

- ☐ Colour blindness
- ☒ Haemophilia

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- ☐ Diabetics
- ☐ Alkaptonuria

66. In humans beings multiple alleles control inheritance of: (1 point)

- ☒ Blood groups
- ☐ Phenylketonuria
- ☐ Colour blindness
- ☐ Sickle cell anemia

67. Polygenic inheritance forms the bases of: (1 point)

- ☐ Codominance
- ☐ Incomplete dominance
- ☒ Continuous variation
- ☐ Discontinuous variation

68. Mr. X & Mrs. X have same genotype I^Ai for blood group. What is the expected probability of the blood group of their children? (1 point)

- ☐ Blood Group 'A'= 1.00, Blood Group 'O'= 0.00
- ☒ Blood Group 'A'= 0.75, Blood Group 'O'= 0.25
- ☐ Blood Group 'A'= 0.50, Blood Group 'O'= 0.50
- ☐ Blood Group 'A'= 0.25, Blood Group 'O'= 0.75

CHEMISTRY

69. Which of the following reactions can be used for the conversion of ethyl alcohol into acetaldehyde? (1 point)

- ☐ Polymerization
- ☒ Dehydrogenation
- ☐ Esterification
- ☐ Reduction

70. Which of the following is formed, when excess of ethyl alcohol is treated with concentrated H₂SO₄ at a low temperature? (1 point)

- Diethyl ether
- Dimethyl ether
- Ethene
- Acetylene

71. Which of the following will give iodoform reaction on the treatment with Na_2CO_3 & I_2 ? (1 point)

- Methanol
- Acetic acid
- Acetic anhydride
- Acetone

72. Which of the following is formed when formaldehyde is treated with oxidizing mixture ($\text{H}_2\text{SO}_4 + \text{K}_2\text{Cr}_2\text{O}_7$)? (1 point)

- Methanol
- Methanoic acid
- Acetone
- Acetaldehyde

73. Dry distillation of which of the following can be done to produce acetone? (1 point)

- Calcium acetate
- Calcium formate
- Ethyl acetate
- Acetic acid

74. The elimination between alkyl halides and strong base takes place by two mechanisms- E_1 and E_2 . How many steps are involved in each one of these? (1 point)

- E_1 elimination is two steps & E_2 is one step
- E_1 & E_2 both take place in one step
- E_1 & E_2 both take place in two steps
- E_1 elimination is one step & E_2 is two steps

75. Which of the following is an example of tertiary alkyl halide? (1 point)

- ☐ 2- chloro butane
- ☐ 1- chloro methyl pentane
- ☐ 2-bromo-3-methyl butane
- ☒ 2-bromo-2-methyl butane

76. Radius of first orbit of hydrogen is 0.53°A . Which orbit has a radius of 4.77°A ? (1 point)

- ☐ First
- ☐ Second
- ☒ Third
- ☐ Fourth

77. Which of the following has only one orientation in space, in the magnetic field? (1 point)

- ☐ p orbital
- ☒ s orbital
- ☐ d orbital
- ☐ f orbital

78. What's the mass of one proton? (1 point)

- ☒ Equal to 1836 electron
- ☐ Equal to positron
- ☐ Equal to electron
- ☐ Equal to 1836 neutron

79. Which of the following is different in Na^+ ($Z=11$), Mg^{+2} ($Z=12$) and Al^{+3} ($Z=13$)? (1 point)

- ☐ Number of shells
- ☐ Number of electrons
- ☐ Electronic configuration

- Number of protons

80. What is the IUPAC name of stearic acid? (1 point)

- Hexanoic acid
- Octadecanoic acid
- Octanoic acid
- Hexadecanoic acid

81. Which of the following is formed when acetone is oxidized? (1 point)

- Formic acid
- Ethanoic acid
- Propanoic acid
- Butyric acid

82. What's the IUPAC name of α , β -dimethyl valeric acid? (1 point)

- 2,3- dimethyl hexanoic acid
- 3,4- dimethyl hexanoic acid
- 3,4- dimethyl pentanoic acid
- 2,3- dimethyl pentanoic acid

83. What volume of oxygen at S.T.P required to burn 500 dmt of ethene? (1 point)

- 500 dmt
- 1000 dmt
- 1500 dmt
- 2000 dmt

84. Valence shell electronic configuration of an element is $4s^2 4p^1$. To which group does the element belong? (1 point)

- IB
- IIIB

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- ☐ IA
- ☒ IIIA

85. Ca (Z=20) forms ionic bond with (Z=17)? What is the chemical formula of (1 point)
Calcium chloride?

- ☐ CaCl
- ☒ CaCl₂
- ☐ Ca₂Cl₂
- ☐ Ca₂Cl

86. CO₂ & SO₂ are two compounds. Which of the following best describes (1 point)
these two compounds?

- ☐ Both CO₂ & SO₂ are linear and non-polar
- ☐ CO₂ is angular and polar SO₂ is linear and non-polar
- ☒ CO₂ is linear and non-polar SO₂ is angular and polar
- ☐ Both CO₂ and SO₂ are angular and polar

87. What hybridization is present on carbon atoms in Ethyne C₂H₂? (1 point)

- ☐ spt
- ☐ sp²
- ☒ sp
- ☐ dspz

88. Which of the following reactions has same value of K_c & K_P? (1 point)

- ☐ N₂ + 3H₂ --> 2NH₃
- ☐ PCl₅ --> PCl₃ + Cl₂
- ☒ H₂ + I₂ --> 2HI
- ☐ 2SO₂ + O₂ --> 2SO₃

89. Which of the following conditions required for maximum yield of (1 point)
ammonia through Haber's process?

- ☐ Increasing temperature
- ☐ Decreasing concentration of reactant
- ☐ Decreasing pressure
- ☒ Decreasing temperature

90. Which of the following is true for reversible reaction at equilibrium? (1 point)

- ☐ The rate of forward reaction is greater than backward reaction
- ☐ The rate of forward reaction is lesser than backward reaction
- ☒ The rate of backward reaction is equal to forward reaction
- ☐ The rate of backward reaction is greater than forward reaction

91. When benzene reacts with isopropyl chloride in the presence of AlCl_3 as Lewis acid, the product formed is isopropyl benzene. What is this reaction called? (1 point)

- ☐ Friedal Craft acylation
- ☒ Friedal Craft Alkylation
- ☐ Halogenation of benzene
- ☐ Benzene sulphuric acid

92. Benzene is subjected to (1) Alkylation (2) Nitration (3) Oxidation the product is: (1 point)

- ☐ m-nitrobenzoic acid
- ☒ o-nitro benzoic acid and p-nitro benzoic acid
- ☐ m-nitro toluene
- ☐ o-nitro toluene and p-nitro toluene

93. Isopropyl chloride is an example of: (1 point)

- ☐ Primary alkyl halide
- ☒ Secondary alkyl halide
- ☐ Tertiary alkyl halide
- ☐ Quaternary alkyl halide

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94. Oxidation of toluene by KMnO_4 , the product is: (1 point)
- ☐ o-nitro toluene
 - ☐ p-nitro toluene
 - ☐ m-nitro toluene
 - ☒ Benzoic acid
95. What is the IUPAC name of chloroform? (1 point)
- ☐ Chloro methane
 - ☐ Di chloro methane
 - ☒ Tri chloro methane
 - ☐ Tetra chloro methane
96. Which of the following produces Maleic anhydride, on oxidation of: (1 point)
- ☐ Acetylene
 - ☐ Phenol
 - ☐ Toluene
 - ☒ Benzene
97. What is the oxidation number of Mn in K_2MnO_4 ? (1 point)
- ☐ +2
 - ☐ +4
 - ☒ +6
 - ☐ +7
98. In electrochemical series, what is the electrode potential of all metals above Hydrogen? (1 point)
- ☐ Zero
 - ☒ Negative
 - ☐ Positive
 - ☐ Greater than zero

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99. Organic compound are classified into: (1 point)

- ☐ Carbons compounds and non carbon compounds
- ☒ Open chain and closed chain compound
- ☐ Homocyclic and heterocyclic compounds
- ☐ Aromatic and cyclic compounds

100. Which of following are the three isomers of Pentane? (1 point)

- ☒ n-pentane, 2-methyl butane, 2,2-dimethyl propane
- ☐ n-pentane, 2-methyl butane, 2,2-dimethyl butane
- ☐ n-pentane, 3-methyl butane, 2,2-dimethyl pentane
- ☐ n-pentane, 2-methyl pentane, 2,2-dimethyl propane

101. Which type of isomerism can propanal and acetone exhibit? (1 point)

- ☒ Functional group isomerism
- ☐ Chain isomerism
- ☐ Position isomerism
- ☐ Metamerism

102. Graph of volume versus total pressure at constant temperature is: (1 point)

- ☐ A straight line
- ☐ First a curve and then a straight line
- ☐ First a straight line & then a curve line
- ☒ Non linear

103. 1 atm of nitrogen is at 25°C, its pressure has increased to 2 atm at 50°C. (1 point)
Volume will change from 1 dmt to;

- ☒ 0.542 dmt
- ☐ 2 dmt
- ☐ 3 dmt
- ☐ 4 dmt

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104. Which of the following temperatures is referred to as the absolute zero? (1 point)

- ☒ -273.16 °C
- ☐ -273.16 °K
- ☐ 0°C
- ☐ 32 °F

105. An organic compound has C=40%, H=6.67% and O=53.3%. What is the empirical formula of the compound? (1 point)

- ☐ CH₃O
- ☐ C₂H₃O
- ☒ CH₂O
- ☐ C₂H₂O

106. 7.6 grams of CS₂ is reacted with 12.8g of O₂, $\text{CS}_2 + 3\text{O}_2 \rightarrow \text{CO}_2 + 2\text{SO}_2$, limiting reactant is: (1 point)

- ☒ CS₂
- ☐ O₂
- ☐ CO₂
- ☐ SO₂

107. Water rises in capillary tube because of: (1 point)

- ☐ Cohesive force & adhesive forces are same
- ☒ Adhesive forces of molecules exceeds cohesive force
- ☐ Cohesive force is greater than adhesive force
- ☐ Cohesive force and adhesive force to explain the property in the above question is irrelevant

108. Which of the following influences the variation of temperature at which boiling of liquid takes place? (1 point)

- ☒ Outside pressure
- ☐ Outside temperature
- ☐ Volume of container

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- Amount of liquid

109. Enzyme show optimum activity between 37°C to 50°C. It however works: (1 point)

- Above 50°C
- Below 37°C
- It loses activity permanently above 50°C
- It loses activity permanently below 37°C

110. Oxidation of secondary propyl alcohol gives: (1 point)

- Acetone
- Acetaldehyde
- Ethyl alcohol
- Normal propyl alcohol

111. Which of the following is an Amino acid? (1 point)

- Benzoic acid
- Palmitic acid
- Aspartic acid
- Aniline

112. What is the order of reaction if the unit of K is sec⁻¹? (1 point)

- One
- Two
- Three
- Zero

113. Which of the following best describes the ionic reactions of inorganic compounds? (1 point)

- Very slow
- Moderate slow

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- Very fast
- Not occurs

114. Metallic property in a group of P block element has a trend: (1 point)

- Decreases
- Increases
- Remains same
- Irregular trend

115. Superoxide of group IA element (M) has formula: (1 point)

- M_2O
- M_2O_3
- MO_2
- M_2O_2

116. Which pair of the element markedly differ from other members of the respective groups? (1 point)

- Potassium and Calcium
- Sodium and Magnesium
- Caesium and Barium
- Lithium and Beryllium

117. Which of the following is a covalent crystal? (1 point)

- NaCl
- KI
- $MgBr_2$
- Diamond

118. The nature of attraction which holds molecular crystal is: (1 point)

- Ionic bond

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- ☐ Hydrogen bond
- ☐ Covalent bond
- ☒ Van Der Waals force

119. What is the mathematical statement of the first law of thermodynamics? (1 point)

- ☐ $\Delta E = q + w$
- ☐ $\Delta E = -q - w$
- ☐ $\Delta E = -q + w$
- ☒ $\Delta E = q - w$

120. What is ΔH equal to z according to the first law of thermodynamics? (1 point)

- ☐ $\Delta E - P\Delta V$
- ☒ $\Delta E + P\Delta V$
- ☐ $-\Delta E - P\Delta V$
- ☐ $-\Delta E + P\Delta V$

121. Why do transition elements form interstitial compounds? (1 point)

- ☐ Presence of unpaired electrons
- ☐ Transition of elements within d orbitals
- ☒ Holes present in crystal lattice of transition elements
- ☐ Small, highly charged ions and vacant d-orbitals of suitable energy

122. The ligand, diethylene triamine is an example of? (1 point)

- ☐ Bidentate
- ☒ Tridentate
- ☐ Pentadentate
- ☐ Hexadentate

PHYSICS

123. In which spectral series is the far ultraviolet region of electromagnetic spectrum found? (1 point)

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- ☐ Paschen series
- ☐ Balmer series
- ☒ Lyman series
- ☐ Pfund series

124. The ohm's law is applicable if: (1 point)

- ☐ Temperature of the conductor becomes infinite
- ☐ Temperature of the conductor increases
- ☐ Temperature of the conductor decreases
- ☒ Temperature of the conductor remains same

125. Which of the following refers to the DC current that does not change its intensity? (1 point)

- ☐ Eddy's current
- ☐ Surge current
- ☐ Leakage current
- ☒ Steady current

126. The internal resistance of a battery is: (1 point)

- ☐ In parallel to the external load
- ☒ In series to the external load
- ☐ Not connected to the external load
- ☐ Zero

127. The electric potential sets across the terminals of a battery is called: (1 point)

- ☐ Potential difference
- ☐ EMF
- ☐ Internal potential group
- ☒ Terminal voltage

128. 1 J/sec is equals to:

(1 point)

- ☐ 1 K
- ☐ 1 N
- ☐ 1 T
- ☒ 1 Watt

129. Which of the following corresponds to the momentum of a photon?

(1 point)

- ☐ $h\lambda$
- ☒ h/λ
- ☐ λ/h
- ☐ h^2/λ^2

130. If the wavelength of a light is 3×10^{-7} , then what is it its frequency?

(1 point)

- ☐ 1×10^4 Hz
- ☐ 1×10^{14} Hz
- ☒ 1×10^7 Hz
- ☐ 1×10^{16} Hz

131. The energy of light is determined by its:

(1 point)

- ☒ Frequency
- ☐ Intensity
- ☐ Amplitude
- ☐ Speed

132. On which principle does the transformer work?

(1 point)

- ☐ Self induction
- ☒ Mutual induction
- ☐ Motional EMF
- ☐ Magnetic torque

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133. If a transformer has 500 turns on primary coil and 250 turns on secondary coil, then: (1 point)

- ☒ Output voltage is half of input voltage
- ☐ Output and input voltages are equal
- ☐ Output voltage is double of input voltage
- ☐ Output voltage is zero

134. Which of the following defines the change in magnetic flux per unit area? (1 point)

- ☐ Magnetic field
- ☐ Magnetic force
- ☐ Magnetic dipole
- ☒ Magnetic flux density

135. What is the dot product of magnetic induction and unit area? (1 point)

- ☒ Magnetic flux
- ☐ Magnetic induction
- ☐ Magnetic field
- ☐ Magnetic pole

136. What does the magnetic flux measure? (1 point)

- ☐ Area surrounded by a magnet
- ☒ Strength of the magnetic field
- ☐ Rate of change of magnetic force
- ☐ The number of magnetic lines of force

137. The change in electric potential with respect to distance equals to: (1 point)

- ☒ Potential gradient
- ☐ Amount of the charge
- ☐ Potential difference
- ☐ Surface charge density

138. The amount of energy required in moving an electron of charge (e) by the application of 2 volt potential difference equal to: (1 point)

- ☐ 1 keV
- ☐ 1 MeV
- ☐ 1 GeV
- ☒ 1 eV

139. Which law explains the relation between amount of charges and force between them? (1 point)

- ☐ Ohm's law
- ☐ Lenz's law
- ☒ Coulomb's law
- ☐ Ampere's law

140. What does the electric field around a charge represent? (1 point)

- ☐ Size of the charge
- ☒ Effective area for electrostatic force
- ☐ Path followed by the charge
- ☐ Speed of the charge

141. 1 N/C equals to: (1 point)

- ☒ 1 V/m
- ☐ 1 J/C
- ☐ 1 C/m²
- ☐ 1 1/sec

142. What will be the value of acceleration, if a body of mass 0.5 kg is acted upon by force of 10 N? (1 point)

- ☐ 40 m/s²
- ☐ 5 m/s²
- ☐ 10 m/s²

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- 20 m/s^2

143. What is the time rate of change of linear momentum? (1 point)

- Acceleration
- Force
- Velocity
- Work

144. Radiations are dangerous to living organism because they damage the cell by: (1 point)

- By producing ions in the cells
- By increasing the temperature of cells
- By decreasing the number of cells
- By destroying the cells

145. Which of the following results in the centripetal acceleration is produced in a body? (1 point)

- Change in magnitude of velocity
- Change in mass
- Change in magnitude of force
- Change in direction of velocity

146. 1 radian is equals to: (1 point)

- 0.573°
- 5.73°
- 57.3°
- 573°

147. A wheel of bike rotates from rest and achieves 6.28 radian/sec in 2 seconds. What will be its angular acceleration? (1 point)

- 1 rad/sec^2

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- ☐ 1.5 rad/sec²
- ☒ 3.14 rad/sec²
- ☐ 6.28 rad/sec²

148. The ratio between linear velocity and radius equals to: (1 point)

- ☐ Angular displacement
- ☒ Angular velocity
- ☐ Angular acceleration
- ☐ Angular momentum

149. Which law has a graph similar to the graph of isothermal process? (1 point)

- ☒ Boyle's law
- ☐ Charle's law
- ☐ Avogadro's law
- ☐ Law of heat exchange

150. Due to sudden rain, which of the following is true for the car moving on the road? (1 point)

- ☐ Force of engine decreases
- ☐ Balance will not be maintained
- ☐ Direction of motion will be effected
- ☒ Linear momentum increases

151. Which of the following are the application of Doppler's effect? (1 point)

- ☐ Hologram technology
- ☒ Measuring the speed of automobile
- ☐ Determining speed of light in mediums
- ☐ Sending radar signals

152. Longitudinal waves exhibit: (1 point)

- ☐ Polarization
- ☐ Particle nature
- ☐ Property of energy transmission in space
- ☒ Phenomena of superposition of waves

153. The property of the system that does not change during adiabatic change (1 point) is:

- ☐ Temperature
- ☐ Volume
- ☐ Pressure
- ☒ Amount of heat

154. Which statement is the best for electric flux of a point charge? (1 point)

- ☐ Independent of charge
- ☐ Independent of medium
- ☒ Independent of shape of surface in which charge is enclosed
- ☐ Independent position of charge in shape

155. In beta positive decay, the nuclear number is: (1 point)

- ☒ Conserved
- ☐ Not conserved
- ☐ Unstable
- ☐ Stable

156. Which of the following expression is constant for a freely falling body? (1 point)

- ☐ $mgh + mv^2$
- ☐ $mgh - mv^2$
- ☒ $mgh + \frac{1}{2}mv^2$
- ☐ $mgh - \frac{1}{2}mv^2$

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157. The product of frequency and wavelength of a wave equals to: (1 point)

- ☐ Displacement of the wave
- ☐ Amplitude of the wave
- ☒ Speed of the wave
- ☐ Time period of the wave

158. Two bodies of masses 10 kg and 40 kg are dropped from the same height (1 point) at the same time. Value of which of the following remains the same during the motion of the two bodies?

- ☒ Acceleration
- ☐ Kinetic energy
- ☐ Potential energy
- ☐ Power

159. A body of mass 4 kg is moving a circle of radius 2m. If the body moves (1 point) round a complete circle, what is the work done by the body?

- ☐ 8J
- ☒ Zero
- ☐ 16J
- ☐ 6J

160. 1 kilowatt-hour (kWh) equals to: (1 point)

- ☐ 3.6 J
- ☐ 3.6 kJ
- ☒ 3.6 MJ
- ☐ 3.6 GJ

161. In standing waves, the distance between two consecutive nodes or anti-nodes is: (1 point)

- ☐ 2λ
- ☒ $\lambda/2$
- ☐ $\lambda/4$

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☐ λ

162. If the fundamental frequency of vibration of a string fixed both ends is 50Hz, the fourth harmonic will be: (1 point)

- ☒ 200Hz
- ☐ 150Hz
- ☐ 12.5Hz
- ☐ 250Hz

163. A ball is thrown horizontally with 19.6 m/s. After 2 seconds it's horizontal velocity component will be: (1 point)

- ☐ 4.9 m/s
- ☐ 9.8 m/s
- ☒ 19.6 m/s
- ☐ 39.2 m/s

164. In the projectile motion, the acceleration in the horizontal direction: (1 point)

- ☐ Remains same
- ☐ Varies with time
- ☒ Is zero
- ☐ Is positive

165. In vibratory motion the maximum displacement of the body on either side of its equilibrium position is called: (1 point)

- ☐ Distance
- ☐ Displacement
- ☒ Amplitude
- ☐ Frequency

166. The process in which no external work is performed is called: (1 point)

- ☐ Isobaric

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- Isochoric
- Isothermal
- Adiabatic

167. Induced EMF in A.C. generator can be increased by: (1 point)

- Decreasing area of coil
- Decreasing magnetic field
- Increasing area of coil
- Slowing down speed of coil

168. A transformer is used to: (1 point)

- Transform alternating current and voltage
- Convert alternating current into direct current
- Convert mechanical energy into electrical energy
- Convert direct current into alternating current

169. A semi-conductor diode can be used as: (1 point)

- A full wave rectifier
- An amplifier
- A transmitter
- A half wave rectifier

170. Half-life of radon gas is: (1 point)

- 3.8 minutes
- 3.8 days
- 3.8 months
- 38 years

171. Two capacitors $6\mu\text{f}$ and $12\mu\text{f}$ are in series connected across a 200 volts D.C. supply. Calculate the charges on each capacitor, respectively. (1 point)

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- $8 \times 10^{-4} \text{C}$, $8 \times 10^{-4} \text{C}$
- $8 \mu\text{C}$, $8 \mu\text{C}$
- $8 \times 10^4 \text{C}$, $16 \times 10^4 \text{C}$
- 800C , 800C

172. Soft cylindrical electrical conducting wire has resistance R . It is stretched so (1 point) that its length is doubled but its radius stays constant. What would be the new resistance?

- $R/2$
- R
- $4R$
- $2R$

173. The speed of sound at 0°C in air is 332 m/s . What will be the speed of (1 point) sound at 50°C ?

- 300 m/s
- 332 m/s
- 362 m/s
- 382 m/s

174. A force $2F$ acting on a particle of mass 10 kg produces an acceleration of (1 point) 30 m/s^2 . A force $5F$ acting on a particle of mass M produces and acceleration are 25 m/s^2 . What is the mass M ?

- 30 kg
- 21 kg
- 4.8 kg
- 3.3 kg

175. The main function of a transformer is to convert: (1 point)

- One direct voltage to another direct voltage of different magnitude
- One alternating voltage to another alternating voltage of different magnitude
- High value alternating voltage to a low value direct voltage
- A low value alternating voltage to a high value direct voltage

176. An atom makes a transition from a state of energy E_2 to one of lower energy E_1 . Which of the following gives the wavelength of the radiation emitted, in terms of the Planck's constant h and the speed of light c ? (1 point)
- ☐ $E_2 - E_1 / hc$
 - ☐ $hc/E_2 - hc/E_1$
 - ☒ $hc/E_2 - E_1$
 - ☐ $c/h(E_2 - E_1)$

ENGLISH

177. Identify the fragment in the following options: (1 point)
- ☐ He went to the store
 - ☒ Quickly, before the rain started.
 - ☐ The cat, sitting on the windowsill.
 - ☐ She had a delicious meal.
178. Identify the sentence with the incorrect use of apostrophe: (1 point)
- ☐ That is Mary's book.
 - ☐ The dog's leash is in the car.
 - ☒ Its a beautiful day outside
 - ☐ The childrens' toys are in the playroom.
179. Which sentence demonstrates the correct use of past tense? (1 point)
- ☐ She will go to the store yesterday.
 - ☐ They will be eating lunch now.
 - ☒ He had finished his homework before dinner.
 - ☐ We are meeting them tomorrow.
180. Which of the following sentences has the correct word order? (1 point)

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- She usually goes for jogging in evening.
- In the evening goes she usually for jogging.
- She goes to the usually for jogging evening.
- Usually she for jogging goes in the evening.

181. What would be the suitable response to the question: "How was your day at school?" (1 point)

- I am going to the park.
- My favourite subject is math.
- It was great, thanks for asking!
- I don't like School.

182. Identify the error in the sentence: "His the car is red." (1 point)

- It is a correct sentence
- The article "His" is unnecessary.
- The word order is incorrect; it should be "His car is red."
- The adjective "red" should be "blue."

183. What is the antonym of "generous"? (1 point)

- Selfish
- Charitable
- Benevolent
- Kind

184. The sun began to _____ behind the mountains, casting a warm and beautiful glow across the valley. (1 point)

- Rise
- Set
- Shine
- Sleep

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185. After a long day at work, Sarah found _____ in her favourite book, (1 point)
escaping into captivating world.

- ☒ volace
- ☐ chaos
- ☐ endurance
- ☐ agony

186. Identify the sentence with incorrect use of punctuation: (1 point)

- ☐ I am going to the store; do you need anything?
- ☐ I am going to the store, do you need anything?
- ☒ I am going to the store do you need anything?
- ☐ "I am going to the store; do you need anything"?

187. Which sentence has correct grammatical and style structure? (1 point)

- ☒ They're playing soccer.
- ☐ They playing soccer.
- ☐ Their playing soccer.
- ☐ They have play soccer.

188. Choose the sentence with correct use of apostrophe in possessives: (1 point)

- ☐ The cats toys are in the corner.
- ☒ The cat's toys are in the corner
- ☐ The cats' toys are in the corner
- ☐ The cats' toys' are in the corner

189. Which article should be used in the blank to make the sentence (1 point)
grammatically correct: "He lives in _____ old house."

- ☐ a
- ☒ an
- ☐ the
- ☐ blank

190. Identify the mistake in the use of prepositions in the following sentence: (1 point)
"She is good at cooking in the kitchen."

- It is a correct sentence
- The preposition "at" should be omitted.
- The preposition "in" should be "on."
- The preposition "cooking" should be "to cook."

191. Which sentence demonstrates correct subject verb agreement? (1 point)

- The cat are sleeping.
- The cats is sleeping.
- The cat is sleeping.
- The cats are sleeping.

Read the passage and answer the following three questions.

Nobody knows when fiction started. Perhaps, the first storyteller was a prehistoric mother trying to explain the world to her children. Or maybe it was a hunter telling about his adventures around the campfire. Who can tell? What we do know, though, is that story-telling was a purely oral activity around 800 BC. Myths and tales were passed down by word of mouth and had to be memorized by each new generation of storytellers. This oral traditions only example of Homer, a blind professional storyteller, who lived in the 8th century BC.

192. The contextual meaning of fiction is: (1 point)

- narrative
- textbook
- prose
- Truth

193. The Myths were passed down by: (1 point)

- written scriptures
- carved activity
- by word of mouth

- ☐ inscribed activity

194. It's stressed in the passage that story-telling:

(1 point)

- ☐ began as a written activity
- ☐ became far more popular with the invention of writing
- ☐ was first introduced by Homer in ancient times
- ☒ possibly began in prehistoric times

LOGICAL REASONING

195. Essa is younger than Moosa.

(1 point)

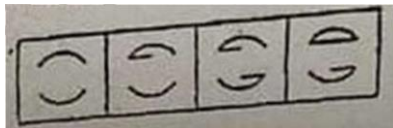
X= Twice Essa's age.

Y= Moosa's age

Which of the following is true about this information?

- ☐ $X > Y$
- ☐ $Y > X$
- ☐ $X = Y$
- ☒ The relationship cannot be determined

196. Look carefully at the symbols to find the pattern. Select the pattern from (1 point)
the options given below.



- ☐ A

- ☐ B
- ☐ C
- ☒ D

197. Sara is 5 ranks below the top student Falq, in a class of 50 students. (1 point)
What is Sara's rank from the bottom of the class?

- ☐ 5th
- ☐ 15th
- ☒ 45th
- ☐ 55th

198. If blue is called "green", green is called "white", white is called "red" (1 point)
and red is called "yellow", what is the colour of milk?

- ☐ White
- ☐ Green
- ☐ Yellow
- ☒ Red

199. Read the statement and following courses of action carefully. Then select (1 point)
the most appropriate options.

Statement: English language skills of students in XYZ school or below
the town average.

i All English language teachers in XYZ school, should be replaced with
good ones.

ii All English language teachers in XYZ school, should be provided a
training course.

- ☐ The most appropriate approach is (i)
- ☒ The most appropriate approach is (ii)
- ☐ Both (i) and (ii) are appropriate approaches
- ☐ None of (i) or (ii) is an appropriate

200. Read the two statements carefully and then choose the best from the options to follow. (1 point)

Statement I- It was raining cats and dogs.

Statement II- The football match was cancelled.

- Statement (I) is the cause and statement (II) is its effect.**
- Statement (II) is the cause and statement (I) is its effect.**
- Both the statements (I) and (II) are independent.**
- Both the statements (I) and (II) are effect of independent causes.**